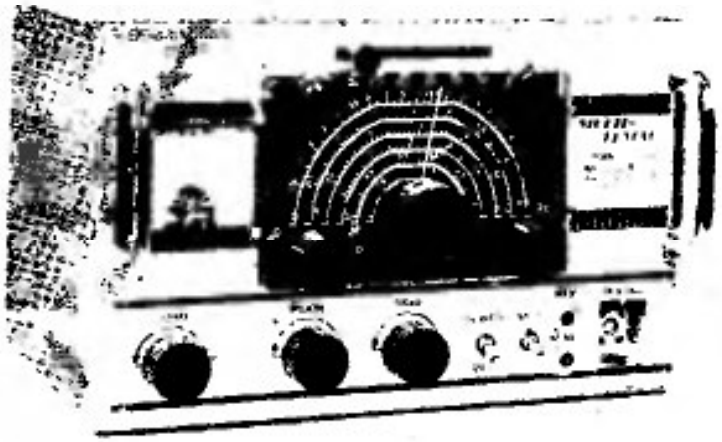
MULTI-ELMAC

Amateur Trans-citer

MODEL AF.67



INSTALLATION
AND
OPERATING INSTRUCTION
MANUAL

MULTI-PRODUCTS CO **OAK PARK, MICH.**

Manufacturers of "MULTI-ELMAC" Products

MULTI-PRODUCTS COMPANY

Manufacturer of

MULTI-ELMAC

RADIO COMMUNICATIONS

AND CONTROL EQUIPMENT

21470 COOLIDGE HIGHWAY **OAK PARK 37, MICH.**

FORM NO. M-106

Instruction Manual

FOR

MULTI-ELMAC TRANS-CITER – MODEL AF-67

SECTION 1 — Description

SECTION 2 — Installation and Operation

SECTION 3 — Service and Alignment

SECTION 4 — Appendix

SECTION 1

Description

1.1 GENERAL. The MULTI-ELMAC AF-67 Trans-citer is a ten tube variable frequency or crystal controlled seven band transmitter or exciter. All circuits are simultaneously switched to the desired band by a single bandswitch lever.
Designed as a complete transmitter for mobile or fixed installations, or an exciter to drive a higher power transmitter. When used as an exciter the 500 ohm tap on modulation transformer can be used to drive the higher power modulators.

1.2 DIMENSIONS. The maximum external dimensions of the AF-67 Trans-citer, excluding projections of control knobs, is 11¼ inches wide, 7 inches high, and 8½ inches deep behind panel. Approximate weight is 18 pounds.

1.3 CIRCUIT DESCRIPTION. The AF-67 Trans-citer employs a variable frequency oscillator with output on either 1.75 to 2.0 Mc. or 3.5 to 4.0 Mc. In addition to the V.F.O. feature, two crystal positions are included for operation on two spot frequencies. Any crystal that will work straight through, double, or quadruple to the desired frequency may be used. The oscillator circuit employs a voltage regulator tube to maintain the plate voltage at a constant level.
The multiplier stages are broad tuned with a front panel control for peaking the final grid, insuring best performance on all bands. The audio circuit is designed to use either a carbon microphone or a low output microphone such as a crystal or dynamic. A slide switch on the rear apron on the AF-67 Trans-citer sets up the circuit for use with either type of microphone. A reactance tube modulator is incorporated in the variable frequency oscillator circuit for narrow-band-frequency-modulation. The variable frequency oscillator dial end the meter scale are indirectly illuminsted. The variable frequency oscillator dial scale is directly calibrated in megacycles for each of the amateur bands.

1.4 TUBE COMPLEMENT. The AF-67 Trans-citer is supplied complete with all tubes, tested in the individual unit, as follows:

6AK6	Oscillator
6BJ6	Reactance modulator
6AG5	Buffer-multiplier
6AQ5	R.F. Driver
6146	Final R.F. Amplifier
6AU6	Speech emplifier
12AU7	A.F. Driver
5881 (2)	P.P. Modulators
OB2	Voltage regulator
#44 (2)	Pilot bulbs

1.5 OUTPUT. The AF-67 Trans-citer is designed for use with a resonant antenna coupled to its output with a transmission line of 50 to 300 ohms impedance. Other impedance or balanced lines can be coupled through the use of an antenna tuning device. When used as an exciter the coupling link of the high powered final can be directly connected to the AF-67 with a suitable length of coaxial cable. The MULTI-ELMAC AF-67 is designed for a maximum plate power input of 60 (sixty) watts. Maximum ratings for this Trans-citer are 600 volts at 100 milliamperes; or 500 volts at 120 milliamperes. Full 100% modulation occurs when the modulator plate current swings to about 60% of the final plate current with normal voice frequancies.

1.6 AUDIO. The modulation transformer is provided with a 500 ohm output tap brought to the power plug for driving the grids of high powered modulators. The 5881's will deliver approximately 40 watts of audio with a plate supply of 500 volts.

1.7 **POWER SUPPLY.** The AF-67 Trans-citer was intentionally designed to use an external power supply in order to permit (a) use of PMR-6A receiver power supply to supply the low level stages, (b) use of the AF-67 Trans-citer with an AC operated power supply at a fixed or portable location, (c) use of a dynamotor or vibrator supply in mobile installations, or (d) use of the Trans-citer as a driver-exciter for high powered transmitters. A suitable MULTI-ELMAC power supply MODEL PS-2V for portable or fixed station operation from 115 volt AC lines is available.

1.8 **POWER CONNECTOR.** A 15 prong female connector is provided with each unit. The 15 prong connector allows all circuits to be arranged for maximum flexibility. Making it possible to use the AF-67 Trans-citer in various types of installations.

1.9 **ACCESSORIES.** The following accessories are available for use with the AF-67 Trans-citar:

PS-2V—A universal 115 volt AC power supply. (Supplies 6 or 12 volts AC for filaments and two separate high voltages.)

CFS-1—Cable with a 15 prong female connector and fanning strip to connect the AF-67 to the PS-2V power supply.

SECTION 2

Installation and Operation

2.1 GENERAL CONSIDERATIONS. No two installations being similar, the individual owner of the AF-67 Trans-citer will vary his installation according to space and operating practices. Regardless of these variations whenever the Trans-citer is installed in a mobile unit, there are two essentials that must be observed for proper installation: (1) convenient location for operation, including ease of observation; (2) rigid mechanical mounting. The owner desiring to use the AF-67 as an exciter for higher powered equipment will have his own methods, etc. The usual standard practices for fixed or portable installations will suffice.

2.2 MOUNTING METHODS. The construction of the cabinet on the AF-67 Trans-citer is such that it is readily adaptable to a hanging mount from the lower edge of the car dash board; or a fixed bottom bracket to the floor of the car. A brace to the fire wall will help make a more rigid installation. The AF-67 cabinet is equipped with felt feet for desk-top mounting in fixed or portable installations.

2.3 ANTENNA. The MULTI-ELMAC AF-67 Trans-citer will perform most efficiently when coupled to an antenna resonated to the desired operating frequency. Standard practices should be used for antenna relay control. Typical mobile circuits are shown on drawing #219, page 17, of this manual. The coaxial output connector serves as an output terminal for the transmission line. Coaxial connectors allow the installation of low-pass filters between the Trans-citer and the antenna or antenna tuners. The type of antenna depends upon the individual's preference. The following types of antennas can be directly fed from the AF-67 without an antenna tuner:

Center fed half-wave dipole
Folded half-wave dipole
Parasitic beams
Vertical quarter-wave ground plane
Base or center-loaded mobile whips
Vertical half-wave dipoles, center fed
Any antenna fed with low impedance untuned line.

Refer to the various handbooks on operating other types of antennas such as long wires, zepp fed, off center fed, lezy H, sterba curtains, phased arrays and the like.

2.4 T.V.I. PRECAUTIONS. The MULTI-ELMAC Trans citer's circuitry is such that harmonics falling in the TV channels are at a minimum. The power plug leads are by-passed and other critical circuits designed for maximum harmonic attenuation. Under normal operating conditions the usual low-pass filter in the antenna transmission line, a brute-force filter in the AC power line, end a good efficient ground to the Trans-citer cebinet is sufficient to maintain a harmonic attenuation of 100 db down. Adequate shielding of stages and a completely shielded variable frequency oscillater make this possible.

2.5 POWER SUPPLY REQUIREMENTS. For maximum flexibility the AF-67 Trans-citer power input is arranged for one or two* separate high voltage supplies. Filament input is arranged for either 6 volts @5.2 amp. or 12 volts @2.6 amp. AC or DC. (Refer to Drawing #219, page 17, for proper connections). Plate supply required: 500 volts max. @160 ma. and 250 volts max. @75 ma.

*Any single high voltage supply may be used with a dropping resistor as determined from the graph on page 13 of this manual. Any supply delivering 350 to 500 volts @235 ma. plus the proper filament voltage will suffice.

For mobile operation the power supply of the PMR-6A receiver may be used for the 250 volt supply and the usual dynamotor for the higher voltage supply. By using the receiver power supply for the low level stages the drain on the dynamotor is minimized resulting in more efficient dynamotor operation. More high voltage at a lower bettery drain will be realized. Refer to drawing #219, page 17, for typical circuits.

2.6 CONTROLS. Sufficient controls have been incorporated for maximum flexibility, at the same time keeping operation simple. (See drawing #217, page 15).

Bandswitch	Switches all circuits to the desired amateur bend simultaneously.
Meter switch	A 6 position meter function switch 1. Final grid current, Final off. 2. Final grid current, Final on. 3. Final plate voltage, Final on. 4. Not used. Final on. 5. Modulator plate current, Final on. 6. Final plate current, Final on.
Load control	Controls final load to antenna.
Plate tuning	Resonates final tank circuit.
Grid tuning	Tunes final grid.
Power "on-off" switch	Turns filaments on or off in a mobile installation, also controls primary power in an AC installation.
VFO switch	Connects VFO to receiver power supply for zero beating a carrier.
Mike jack	Microphone and push-to-talk circuit connections.
Key jack	Key connections for CW operation.
Crystal socket	Will hold two crystals in FT 243 holders.
VFO-Crystal switch	Selects either variable frequency operation or operation from either of the two crystals inserted in the socket above.
VFO control	Variable frequency oscillator frequency control. Reads directly in megacycles.
A.F. Gain control	Controls per-centage of modulation or frequency deviation when using NBFM.
AM-NFM-CW switch	(On rear of chassis) Selects either amplitude modulation, narrow band frequency modulation or A1 emmission.
High-low slide switch	(On rear of chassis) High position for crystal or dynamic microphones, low for carbon microphones.

2.7 POWER SUPPLY CONNECTIONS. A 15 prong plug is used for all connections and various possible combinations are diagrammed in drawing #219.

SECTION 3

Service and Alignment

3.1 GENERAL. Satisfactory operation of this Trans-citer depends on several factors. Before removing a transmitter which is performing in an unsatisfactory manner, carefully inspect antenna connection, power cables and plugs, the storage battery and its connections (if a vehicular installation), the AC power source (if operated at a fixed location), and the microphone and relay connections. It is an aggravating waste of time and effort to remove and attempt to service a transmitter when the trouble is an external one.

(a) **Antenna.** If the Trans-citer is functioning properly but does not load look for a broken antenna lead, bad relay contacts or inoperative relay, shorted transmission line or antenna insulator.

(b) **Storage battery.** Check periodically the terminal voltage, specific gravity, level of electrolyte, and the tightness of connections. Check the bettery voltage at the Trans-citer power plug with the Trans-citer operating and drawing full load.

(c) **Cables and plugs.** The initial installation should locate all cables and plugs where they will not be exposed to physical shock or subjected to twisting and bending.

3.2 TUBES. Even though modern methods produce more reliable tubes than ever, the first source of trouble is likely to be a defective tube. Tube failure will produce low grid drive, low plate current, intermittent operation, or a completely dead transmitter. Where a tube change is made in the R.F. portion of the Trans-citer it should be replaced with the same make of tube. If this is not possible the circuits may have to be realigned according to paragraphs 3.5 and 3.6 of this section.

3.3 CIRCUIT FAILURES. Excluding tubes, the most common source of circuit failure, will invariably be found in the many resistors and cepacitors within the Trans-citer. A defective resistor or condenser can usually be found by a point-to-point continuity test, although a careful visual inspection will often show the defective part, such as a charred resistor. The operating voltage chart on pege 14 permits a careful check of operating elements. All measurements are taken with the final plate OFF, bandswitch in the 80 meter position, VFO set to 3.8 megacycles, final grid current resonated for maximum grid current, crystal-VFO switch in VFO position, and audio gain control on minimum. A 20,000 ohms per volt meter is used. (DO NOT use a vecuum tube voltmeter since it will read erroneously in an R.F. field). These measurements were taken using a PS-2V power supply and a line voltage of 117 volts AC. Any power supply can be used that will give the same high voltage.

3.4 GENERAL ALIGNMENT INSTRUCTIONS. Thoroughly familiarize yourself with the layout of all coils and tuning adjustments as shown on drawing #216, page 16, before beginning an alignment. Check all brass slug adjusting screws to make sure that they are not worn so much that they will not hold their setting. If they are too worn to be serviceable they must be replaced.
Check tha pointer to see that it is aligned properly with respect to the stops on the VFO dial.
Check to see that the sprocket and chain are tight on the switch shafts and that the switches are all in their proper position.

You will need an accurats receiver and an accurate signal generator and/or crystals to spot the ameteur band edges.

An alignment job can never be any better than the equipmant with which the Trans-citer was aligned.

3.5 VARIABLE FREQUENCY OSCILLATOR ALIGNMENT.

Turn the meter switch to the left "G" position, final off.
Set bandswitch lever to the 80 meter position.

Set VFO-crystal switch to the VFO position.
Set the VFO dial to 3.5 megacycles.
Set signal generator at 3.5 megacycles, tune receiver to 3.5 megacycles.
Apply plate power to VFO.
Adjust screw #1 until a beat is obtained at 3.5 Mc.
Set the VFO dial to 4.0 megacycles.
Set signal generator and receiver to 4.0 megacycles.
Adjust trimmer #2 for a beat at 4.0 megacycles.
Readjust at 3.5 megacycles, then again at 4.0 megacycles.
It may take several excursions between 3.5 and 4.0 megacycles before a good alignment is achieved.

The 160 meter band will automatically be correct after the 80 meter band is correctly aligned.

Set the bandswitch lever to the 10 meter position.
Set the VFO dial to 29 megacycles.
Set the signal generator and receiver to 29 megacyles.
Adjust screw #3 until a beat is obtained at 29 megacycles.
The remainder of the 10 meter band should be correct.

The 40 meter band will be correct after the 10 meter band is aligned.

Set the bandswitch lever to the 20 meter band.
Set the VFO dial to 14.2 megacycles.
Set the signal generator and receiver to 14.2 megacycles.
Adjust trimmer #4 for a beat at 14.2 megacycles.
The remainder of the 20 meter band should be correct.

The 15 meter band will be correct after the 20 meter band is aligned.

3.6 BUFFER — DRIVER ALIGNMENT.

Turn meter switch to the left "G" position, final off.
Set bandswitch lever to the 160 meter position.
Set VFO-crystal switch to the VFO position.
Set the VFO dial to 1900 kilocycles.
Set the final grid tuning condenser at about the half capacity position.
Adjust screw #11 for maximum grid drive as shown on the meter.

Set bandswitch lever to the 80 meter position.
Set VFO dial to 3.75 megacycles.
Set final grid tuning condenser at about the half capacity position.
Adjust screw #12 for maximum grid drive as shown on the meter.

Set bandswitch lever to the 40 meter position.
Set VFO dial to 7.2 megacycles.
Set final grid tuning condenser at about the half capacity position.
Adjust screw #10 for maximum grid drive as shown on the meter.

Set the bandswitch lever to the 15 meter position.
Set the VFO dial to 21.3 megacycles.
Set the final grid tuning condenser at about the half capacity position.
Adjust screw #8 and #9 for maximum grid drive as shown on the meter.

Set the bandswitch lever to the 20 meter position.
Set the VFO dial to 14.2 megacycles.
Set the final grid tuning condenser at about the half capacity position.
Adjust screw #5 for maximum grid drive as shown on the meter.

Set the bandswitch lever to the 10 meter position.
Set the VFO dial to 28.5 megacycles.
Set the final grid tuning condenser at about the half capacity position.
Adjust screw #6 and #7 for maximum grid drive as shown on the meter.

11 meter band operation is possible using crystal control only.

If 11 meter operation is desired, set the bandswitch to the 10 meter position. Insert the proper crystal into the crystal socket and set the VFO—crystal switch to the corresponding position and adjust the final grid tuning condenser for proper grid drive. Tune up the final plate and loading condenser just the same as for 10 meters.

NOTE: When tuning the buffer and driver slugs it is well to use a grid dip meter or wave meter to make sure all the coils are tuned to the proper bands or harmonics.

3.7 WARRANTY. This Trans-citer has been carefully tested and was shipped from the factory in perfect operating condition. If the set arrives damaged in transit, it is important that you file claim immediately with the carrier.

THE MULTI-PRODUCTS COMPANY, warranting this Trans-Citer to be free from defective material and workmanship, agrees to repair or replace, without charge, any defective unit or accessory within 90 (Ninety) days from the date of sale to the original purchaser, providing the equipment is returned to the manufacturer properly pecked and shipped prepaid by the owner. All such articles returned under this warranty, must be preceded or accompanied with a letter outlining the defects.

Any failure of the equipment following modification by the user, or occurring through application of power supply voltages other than those specified in this instruction manual shall not constitute a defect within this warranty.

This warranty shall not be in effect if the owners registration card is not properly filled out with the model number, serial number, purchase date, from whom purchased, and forwarded to the MULTI-PRODUCTS COMPANY.

The manufacturer reserves the right to make any changes in this unit without obligating itself with respect to prior production.

Appendix

4.1 PARTS LIST.

R11	47K	ohms	1	watt	10%
R12	47K	ohms	1	watt	10%
R20	1000	ohms	1	watt	10%
R21	100K	ohms	½	watt	10%
R22	10K	ohms	1	watt	10%
R23	470K	ohms	1	watt	10%
R24	390	ohms	1	watt	10%
R25	47K	ohms	1	watt	10%
R26	220K	ohms	1	watt	10%
R31	33K	ohms	1	watt	10%
R32	180	ohms	1	watt	10%
R33	47K	ohms	1	watt	10%
R34	1000	ohms	1	watt	10%
R35	1200	ohms	1	watt	10%
R36	470	ohms	1	watt	10%
R37	68	ohms	½	watt	10%
R38	180	ohms	1	watt	10%
R41	100K	ohms	1	watt	10%
R42	180	ohms	1	watt	10%
R51	27K	ohms	1	watt	10%
R52	270	ohms	½	watt	5%
R53	25K	ohms	10	watt	W.W.
R54	6.8	ohms	1	watt	5%
R55	1000	ohms	½	watt	5%
R61	22K	ohms	½	watt	10%
R62	470K	ohms	½	watt	10%
R63	2200	ohms	½	watt	10%
R64	1000	ohms	1	watt	10%
R65	470K	ohms	½	watt	10%
R66	1 meg	ohms	½	watt	10%
R67	47K	ohms	2	watt	10%
R68	270	ohms	½	watt	10%
R70	500K	ohms		potentiometer.	
R71	680	ohms	½	watt	10%
R89	6.8	ohms	1	watt	5%
R90	750K	ohms	2	watt	5%
R101	10K	ohms	10	watt	W.W.

C11A, C11B, C11C } VFO tuning condenser. Part #196-3

C12 27mmf. N750 2½% tubular ceramic
C13 75mmf. variable. Part #CT1B075
C14 33mmf. NPO 2½% tubular ceramic
C15 35mmf. variable Part #CT1B035
C16 75mmf. NPO 2½% tubular ceramic
C17 .001 mfd. 500 volt mica
C18 .005 mfd. disc ceramic

C19 .005 mfd. disc ceramic
C20 .01 mfd. disc ceramic
C21 33mmf. NPO 2½% tubular ceramic
C22 33mmf. NPO 2½% tubular ceramic
C23 .005 mfd. disc ceramic
C24 250mmf. GP tubular ceramic
C25 .01 mfd. disc ceramic
C26 .01 mfd. disc ceramic
C31 120mmf. NPO 10% tubular ceramic
C32 .005 mfd. disc ceramic
C33 1.5mmf. tubular ceramic
C34 .005 mfd. disc ceramic
C35 .005 mfd. disc ceramic
C36A, C36B Dual 25mmf. variable. Part #196-2
C41 100mmf. GP tubular ceramic
C42 .005 mfd. disc ceramic
C43 .005 mfd. disc ceramic
C44 .005 mfd. disc ceramic
C45 5mmf. tubular ceramic
C51 100mmf. GP tubular ceramic
C52 .005 mfd. disc ceramic
C53 .001 mfd. 1000 volt tubular ceramic
C54 .005 mfd. disc ceramic
C55 .005 mfd. 1600 volt disc ceramic
C56 .001 mfd. 1000 volt tubular ceramic
C57A, C57B Dual 140mmf. variable. Part #MC-912A
C58A, C58B Dual 485mmf. variable. Part #196-1
C59 .005 mfd. disc ceramic
C61 .002 mfd. disc ceramic
C62 10 mfd. 50 volt tubular electrolytic
C63 .03 mfd. 600 volt tubular paper
C64 8 mfd. 450 volt tubular electrolytic
C65 .005 mfd. disc ceramic
C66 .005 mfd. disc ceramic
C71 10 mfd. 50 volt tubular electrolytic
C101 .1 mfd. 600 volt tubular paper
C102 .005 mfd. disc ceramic
C103 .005 mfd. disc ceramic
C104 .005 mfd. disc ceramic
C105 .001 mfd. 1000 volt tubular ceramic
L11 Oscillator coil Part #179
L12 Oscillator coil Part #180
L13 2½ MH R.F. choke
L14 Oscillator plate coil Part #B-40
L31 Buffer plate coil Part #B-40
L32 Buffer plate coil Part #D-20
L38 Buffer plate coil Part #G-80 (Less Iron Core)
L41 Driver plate coil Part #G-160
L42 Driver plate coil Part #G-80
L43 Driver plate coil Part #G-40
L44 Driver plate coil Part #G-20
L45 Driver plate coil Part #G-15
L46 Driver plate coil Part #G-10
L51 2½ MH R.F. choke

L52 .47 Microhenry R.F. choke
L53 2½ MH R.F. choke, 250 MA.
L54 160 & 80 meter plate coil Part #183
L55 40 & 20 meter plate coil Part #184
L56 15 & 10 meter plate coil Part #185
L57 2½ MH R. F. choke

T1 Class AB2 driver transformer. Part #121A7
T2 Modulation transformer. Part #121A8

SW11A, SW11B, SW11C, SW11D — VFO section of bandswitch. Part #201

SW12A, SW12B, SW12C — VFO-CRYSTAL selector switch. Part #176

SW31, SW41 — Buffer driver bandswitch. Part #202

SW51A, SW51B, SW51C — Final plate bandswitch. Part #175

SW52A, SW52B, SW52C — Meter switch and final on-off switch. Part #178

SW61A, SW61B — AM-NFM-CW switch Part #177B
SW81A, SW81B — AM-NFM-CW switch Part #177A

SW62 Carbon-crystal microphone switch. S.P.S.T. slide switch

SW101-VFO. Spotting Switch
S. P. D. T. Toggle Switch

SW102 Power on-off switch. S.P.S.T. toggle switch.

B1 22½ volt "B" battery. Burgess #U15

PL1, PL2 #44 pilot bulbs (Do not use any other number.)

M 0 to 1 milliampere meter.

V1	6AK6	Oscillator tube
V2	6BJ6	Reactance modulator tube
V3	6AG5	Buffer-multiplier tube
V4	6AQ5	R.F. driver tube
V5	6146	R.F. final amplifier tube
V6	6AU6	Speech amplifier tube
V7	12AU7	A.F. driver tube
V8	5881	Modulator tube
V9	5881	Modulator tube
V10	OB2	Voltage regulator tube

USE TUNG-SOL 6AQ5 TUBE ONLY FOR BEST RESULTS

Bandswitch lever	Part #191A
Sprocket	Part #159
Sprocket chain	Boston #1 ladder chain
Pull handle	Part #158
Plastic dial escutcheon	Part #151CT
Serial plate	Part #187A
AM-NFM-CW switch linkage	Part #192
Name plate 10¾"x 2⅛"	Part #162A
VFO dial scale	Part #215
Cabinet	Part #195
Front Panel	Part #186

4.2 - RESISTOR GRAPH

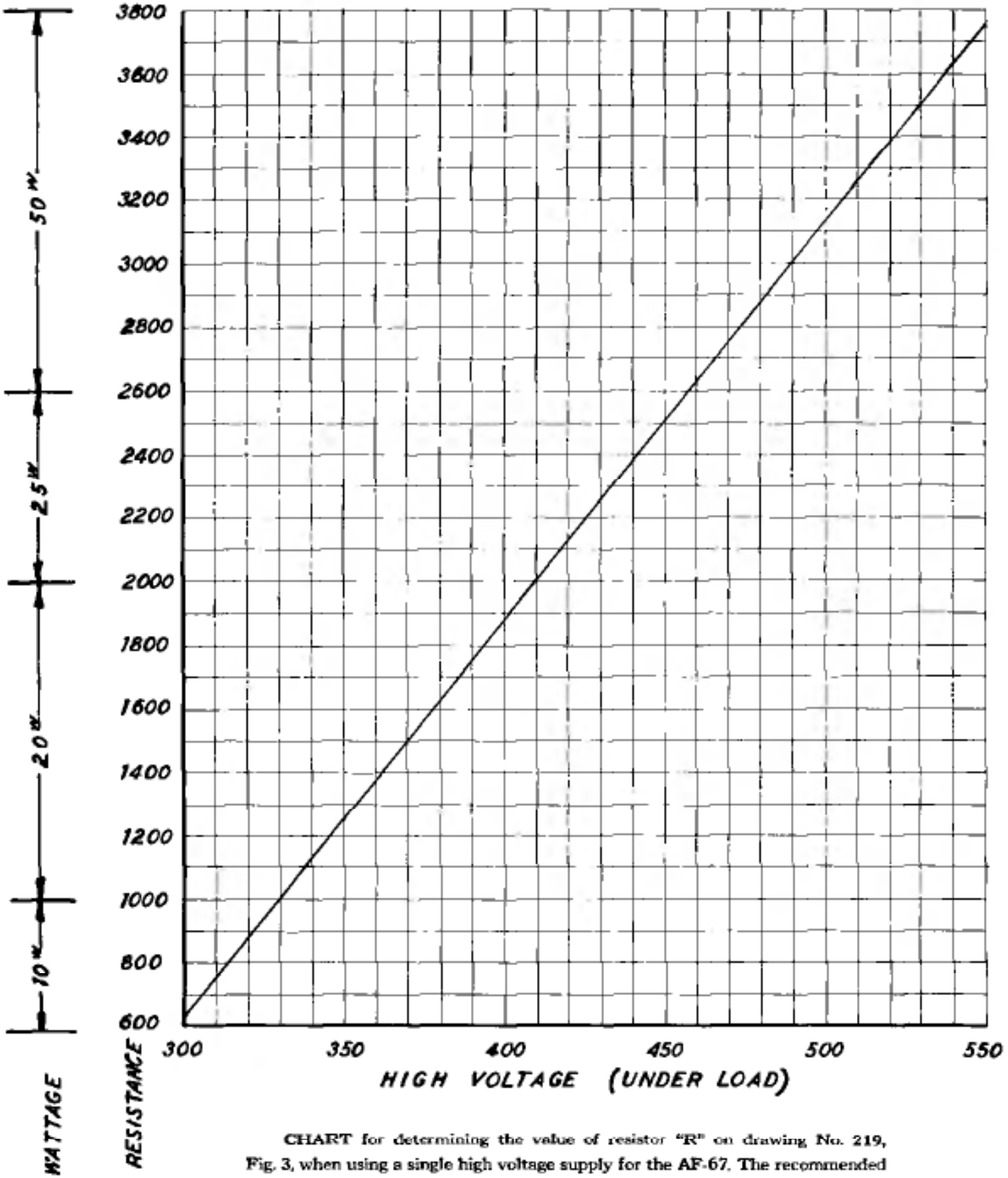


CHART for determining the value of resistor "R" on drawing No. 219, Fig. 3, when using a single high voltage supply for the AF-67. The recommended wattage rating of this resistor is shown at the extreme left above. Be sure to use the actual voltage supplied by the power supply under load when using the chart above.

DRWG. NO. 223

4.3 – OPERATING VOLTAGE CHART

PIN No. ➡		1	2	3	4	5	6	7	8	9
TUBE No. ⬇										
V3	6AG5	—9*	1.0	zero (12.6)**	6.3**	120	145	1.0	—	—
V4	6AQ5	—8.5*	6.7	6.3**	zero	220	220	—8.5*	—	—
V5	6146	zero	zero (12.6)**	Note 1	zero	—	zero	6.3**	zero	—
V6	6AU6	zero	zero	6.3**	zero	35	40	1.5	—	—
V7	12AU7	210	zero	7.6	zero	zero (12.6)**	210	zero	7.6	6.3**
V8	5881	zero	zero (12.6)**	Note 1	220	—22.5	—	6.3**	zero	—
V9	5881	zero	6.3**	Note 1	220	—22.5	—	zero	zero	—
V10	OB2	108	zero	—	zero	108	—	zero	—	—

This chart serves only as a guide, individual sets may vary from these readings.

All measurements made with a 20,000 ohms per volt voltmeter, using a PS-2V power supply or equivalent. Bandswitch lever in the 80 meter position, VFO dial set at 3.8 megacycles, audio gain control set at minimum, VFO—CRYSTAL switch set in the VFO position, meter switch set to the first "G" (plate off) position, final grid tuning condenser resonated for maximum grid current, and the AM-NFM-CW switch set in the AM position.

Note 1—These readings depend upon final plate supply voltage.

* These measurements taken with a 100,000 ohm 1 watt carbon resistor on the end of the negative voltmeter probe.

** Either AC or DC. Numbers in brackets are in effect when connected for 12 volt operation.

4.4 - CONTROL LAYOUT

BANDSWITCH

SWITCHES ALL CIRCUITS TO THE DESIRED BAND SIMULTANEOUSLY.

STEP 2

METER

HAS THREE SCALES:
0-5 MILLIAMPERES
0-150 MILLIAMPERES
0-750 VOLTS D.C.

METER SWITCH

SIX POSITIONS.

ONE (G) READS FINAL GRID CURRENT WITH FINAL AMPLIFIER OFF. (FINAL IS ON IN ALL OTHER METER SWITCH POSITIONS)

TWO (G) READS FINAL GRID CURRENT WITH THE FINAL AMPLIFIER ON.

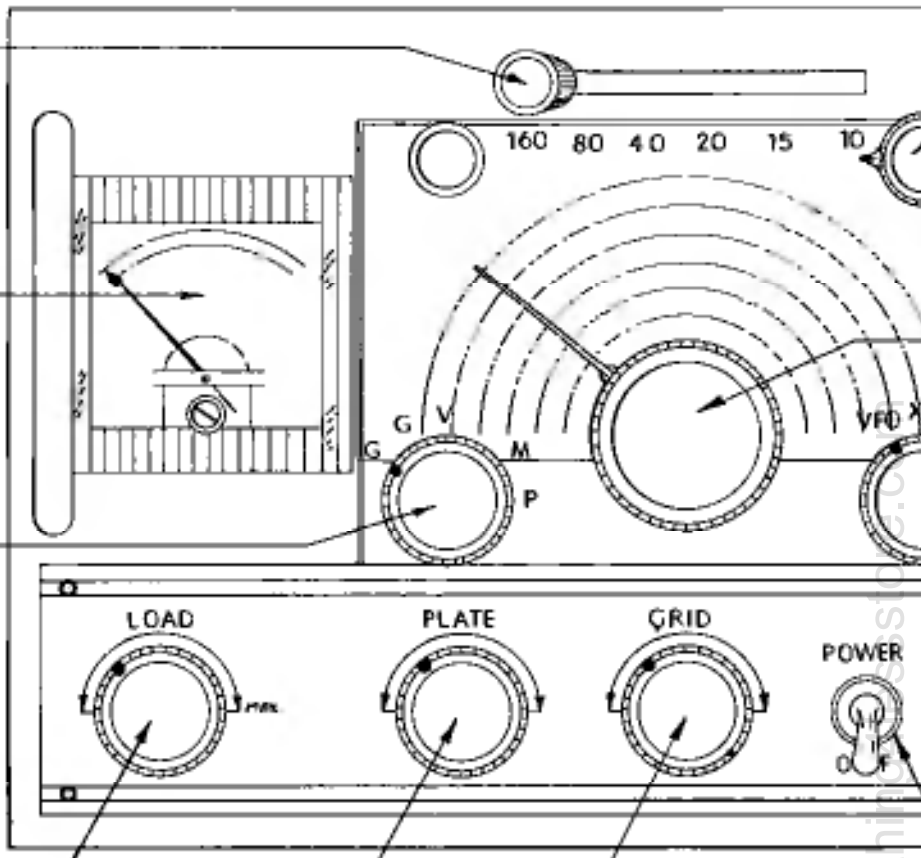
THREE (V) READS FINAL PLATE VOLTAGE.

FOUR (NOT USED).

FIVE (M) READS MODULATOR PLATE CURRENT.

SIX (P) READS FINAL AMPLIFIER PLATE CURRENT.

STEP 5, 7, 8



LOAD CONTROL
PLATE TUNING CONTROL

THESE TWO CONTROLS ARE ALWAYS TUNED TOGETHER.

FIRST WITH THE LOAD CONTROL SET AT MINIMUM (COUNTER-CLOCKWISE) RESONATE PLATE TUNING CONTROL. (METER SWITCH IN POSITION "P" AND TUNE FOR LOWEST PLATE CURRENT)

NEXT TURN LOAD CONTROL CLOCKWISE SLOWLY UNTIL PLATE CURRENT READS APPROXIMATELY 100 TO 120 MILLIAMPERES

AGAIN RESONATE PLATE TUNING CONTROL.

IF THE PLATE CURRENT DROPS BELOW THE DESIRED PLATE CURRENT INCREASE THE SETTING OF THE LOAD CONTROL.

ALWAYS RESONATE PLATE TUNING CONTROL AFTER LOAD CONTROL HAS BEEN CHANGED.

STEP 7

STEP 7

FINAL GRID TUNING

ADJUST FOR PROPER FINAL GRID CURRENT. (2½ TO 5 MA.)

STEP 6

OPERATING INSTRUCTIONS

1. Turn on filaments and allow about two minutes warm-up time.
2. Select band desired with bandswitch lever.
3. Select type of operation desired, crystal or V.F.O. (For these instructio consider V.F.O. operation). Also select type of emission desired; AM CW. Selected by a switch on the rear apron of the transmitter.

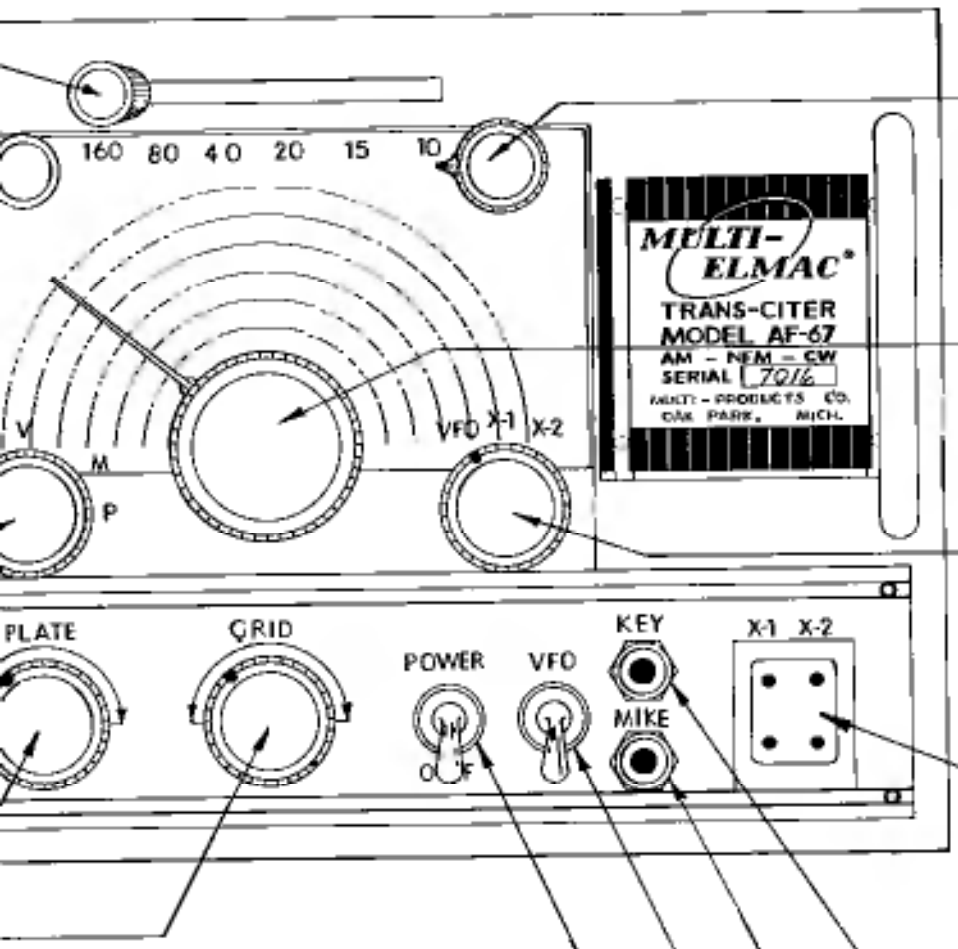
4a. Set V.F.O. dial to desired frequency in megacycles.

—OR—

4b. Flip V.F.O. spotting switch to the upper position and turn V.F.O. con zero beat is obtained with the signal on whose frequency you wish t When this adjustment is made flip the V.F.O. spotting switch to dow

5. Set the meter switch to the first (G) position.
6. Operate the push-to-talk button on the microphone or operate altern mit-receiver" switch and adjust grid tuning control for proper grid to 5 milliamperes).
7. Set meter switch to (P) position and load the transmitter to the ante plained at left. Note: Antenna must be resonant at the frequency operation is desired. Grid current should now be checked under second (G) position.
8. Set meter switch to position (M) and check modulator current (when modulation). The A.F. gain control located in the upper right cor V.F.O. dial controls the per-centage of modulation. Modulator pl should swing to about 60 to 70% of final amplifier plate current valu modulation.

AF-67 OPERATING INSTRUCTIONS		
MULTI-PRODUCTS CO.	10-1-53 G.E.U	217



A.F. GAIN CONTROL

STEP 6

CONTROLS PER-CENTAGE OF MODULATION WHEN USING "AM".

CONTROLS DEVIATION WHEN USING "NBFM".

CONTROLS A.F. GAIN WHEN USING THE ELMAC AF-67 TRANS-CITER AS A SPEECH AMPLIFIER-EXCITER FOR A HIGHER POWER TRANSMITTER.

V.F.O. CONTROL

STEP 4A

A VERNIER DRIVE CONTROL THAT INDICATES THE FREQUENCY OF OPERATION DIRECTLY IN MEGACYCLES.

V.F.O. – CRYSTAL, SELECTOR SWITCH

STEP 3

THE ELMAC AF-67 TRANS-CITER CAN BE OPERATED FROM THE BUILT-IN V.F.O. OR EITHER OF TWO CRYSTALS INSERTED INTO THE SOCKET BELOW.

CRYSTAL SOCKET

WILL HOLD TWO CRYSTALS IN FT 243 HOLDERS.

KEY JACK

USES A TWO CIRCUIT PHONE PLUG SUCH AS PL-55 OR EQUAL.

MICROPHONE JACK

ALSO CARRIES THE PUSH-TO-TALK CIRCUIT USES A THREE CIRCUIT PHONE PLUG SUCH AS MALLORY TYPE 76 OR EQUAL.

V.F.O. SPOTTING SWITCH

STEP 4B

WHEN IT IS DESIRED TO ZERO-BEAT A SIGNAL FLIP THIS SWITCH TO THE UPPER POSITION. THIS CONNECTS THE V.F.O. B PLUS LEAD TO PIN #8 ON THE POWER PLUG WHICH CAN BE CONNECTED TO THE RECEIVER B SUPPLY.

POWER ON-OFF SWITCH

STEP 1

CONTROLS FILAMENTS ON D.C. OPERATION. CONTROLS THE MAIN A.C. LINE ON 115 VOLT A.C. OPERATION.

OPERATING INSTRUCTIONS

ts and allow about two minutes warm-up time.

ired with bandswitch lever.

peration desired, crystal or V.F.O. (for these instructions we will operation). Also select type of emission desired; AM, NFM, or y a switch on the rear apron of the trans-citer.

to desired frequency in megacycles.

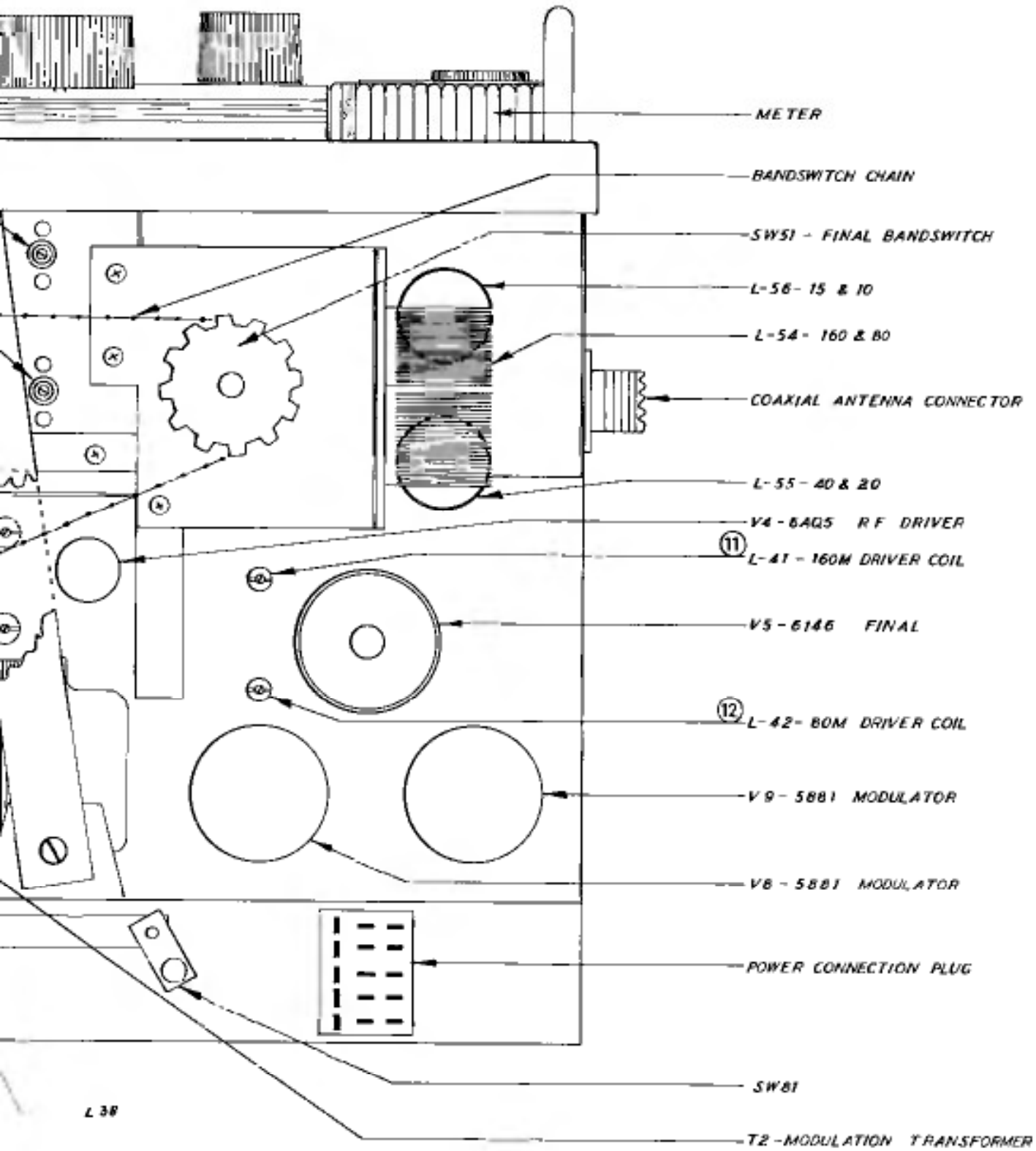
ting switch to the upper position and turn V.F.O. control until a tained with the signal on whose frequency you wish to operate. stment is made flip the V.F.O. spotting switch to down position.

witch to the first (G) position.

alk-to-talk button on the microphone or operate alternate "trans- witch and adjust grid tuning control for proper grid drive (2½ ras).

h to (P) position and load the transmitter to the antenna as ex- Note: Antenna must be resonant at the frequency on which ssired. Grid current should now be checked under load in the ition.

h to position (M) and check modulator current (when using AM he A.F. gain control located in the upper right corner of the trols the per-centage of modulation. Modulator plate current about 60 to 70% of final amplifier plate current value for 100%

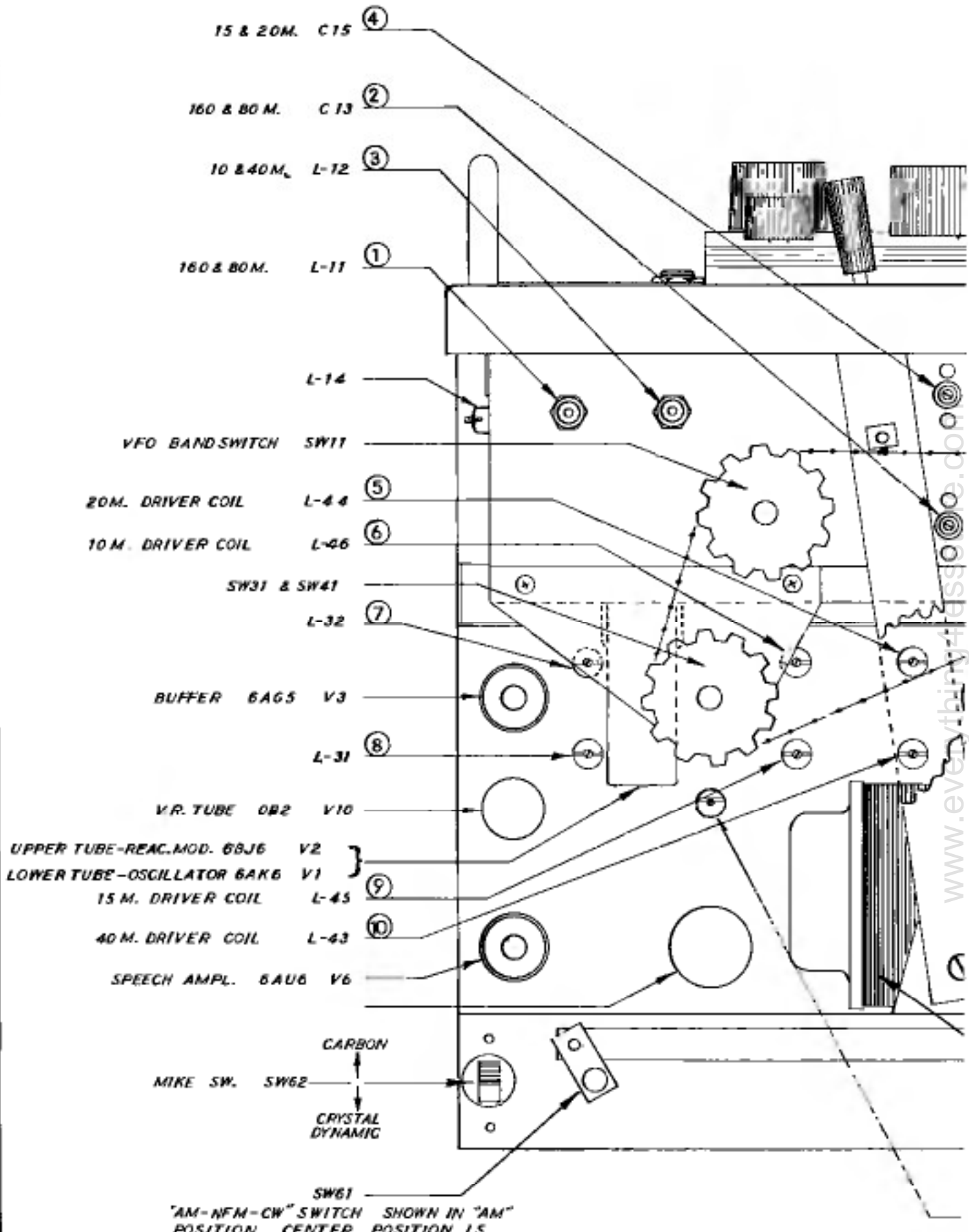


L 38

PC. GEU | DR. NO. 216

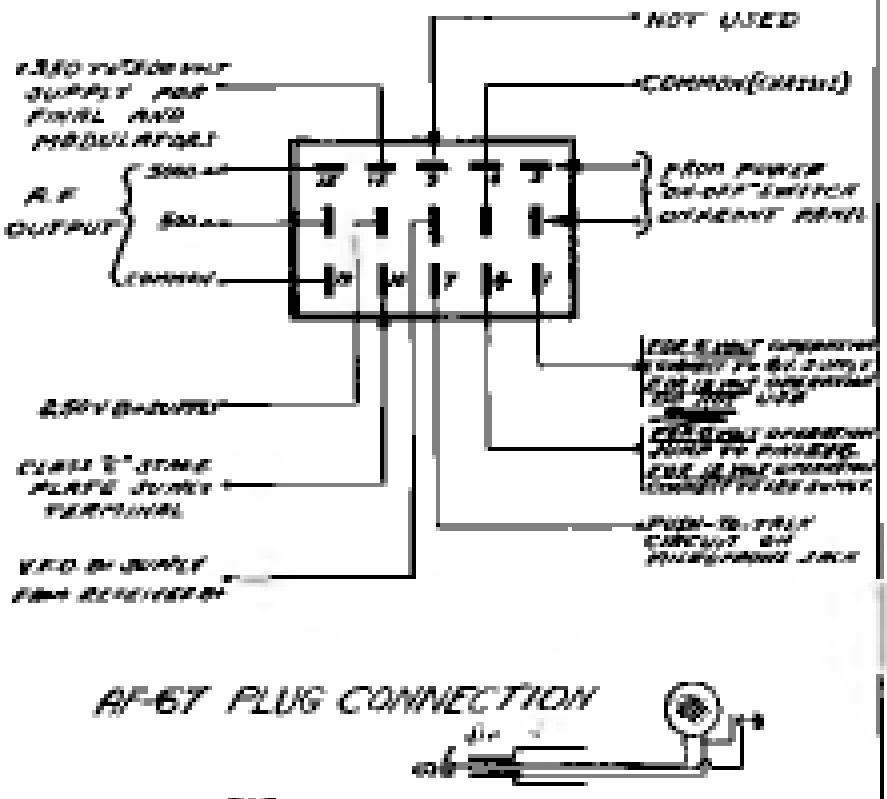
REVISED 2-16-56 FOR L38

4.5 - CHASSIS LAYOUT



AF-67 TUBE LAYOUT MPC. GE

4.6-TYPICAL POWER PLUG CONNECTIONS



AF-67 PLUG CONNECTION

FIG. 1 — MICROPHONE PLUG CONNECTIONS

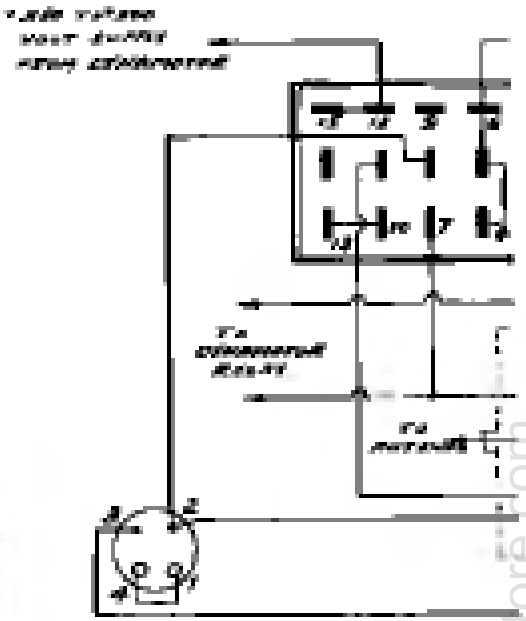
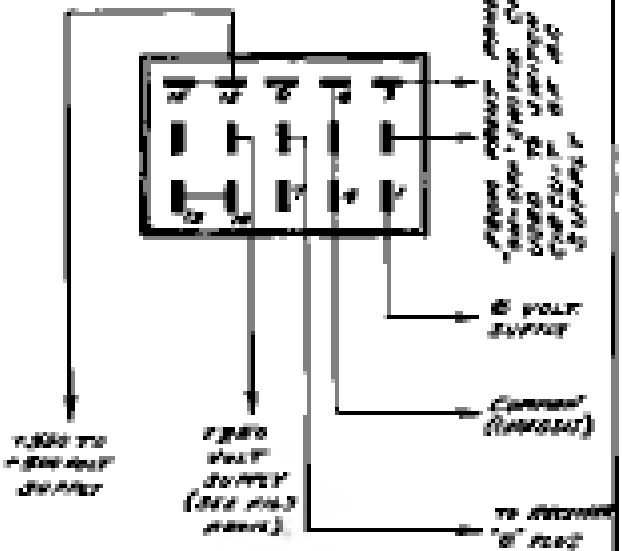
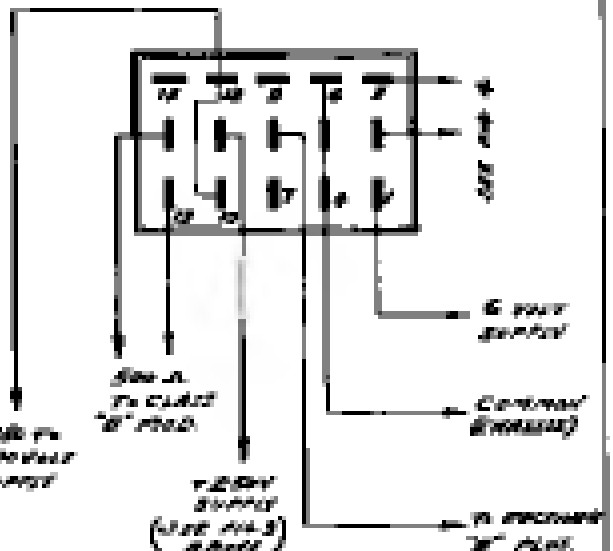


FIG. 2 — A TYPICAL USING AN ELTRAC POWER PACK UNIT



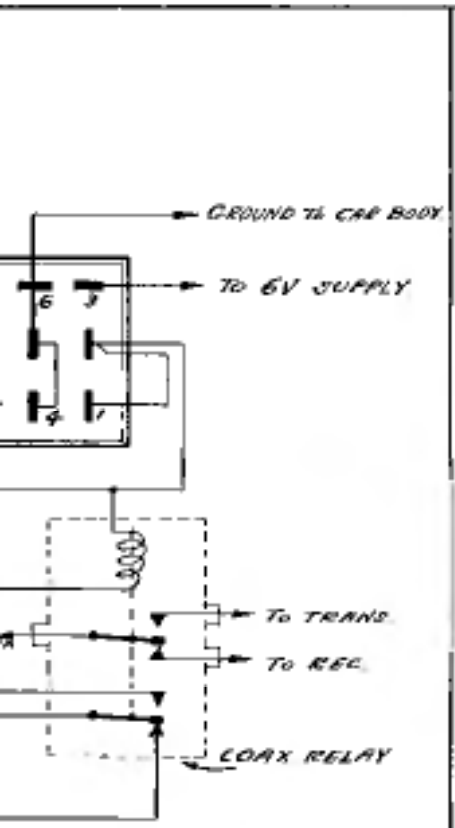
TYPICAL A.C. OPERATION USING ANY NON-AF ELTRAC EQUIPMENT

FIG. 4

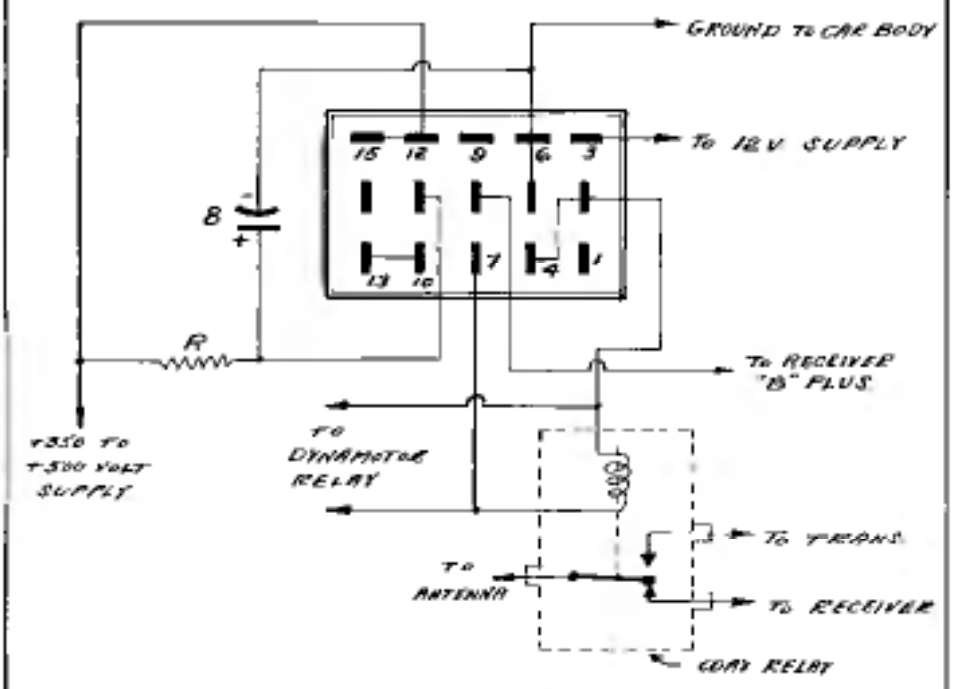


A.C. OPERATED ELTRAC AND SPEECH AMPLIFIER

FIG. 5



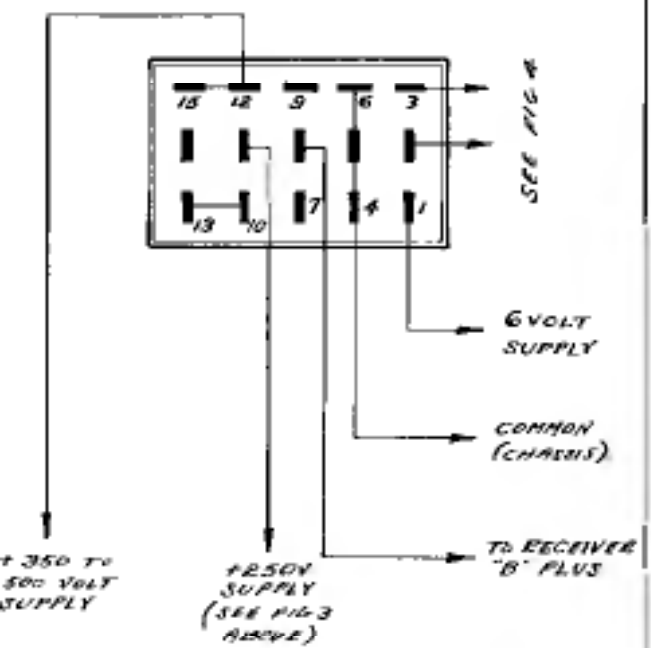
FOR 6 VOLT D.C OPERATION.
ICAL MOBILE INSTALLATION
ELMAC PSR-6 RECEIVER POWER
NE +250 VOLT SUPPLY



FOR 12 VOLT OPERATION

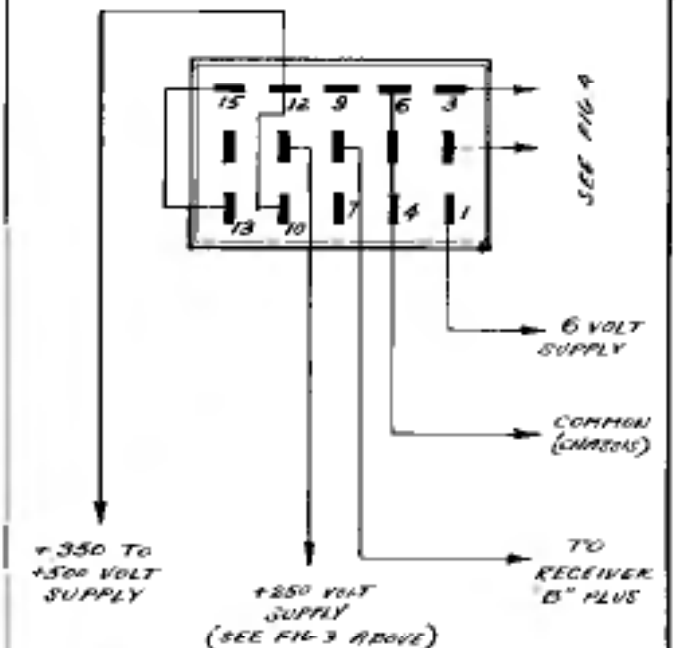
A TYPICAL MOBILE INSTALLATION USING A COMMON HIGH VOLTAGE SUPPLY. THE VALUE OF RESISTOR "R" IS DETERMINED FROM THE CHART

FIG. 3



AC OPERATED EXCITER, DRIVING CLASS "B" LINEAR AMPLIFIER (AM ONLY)

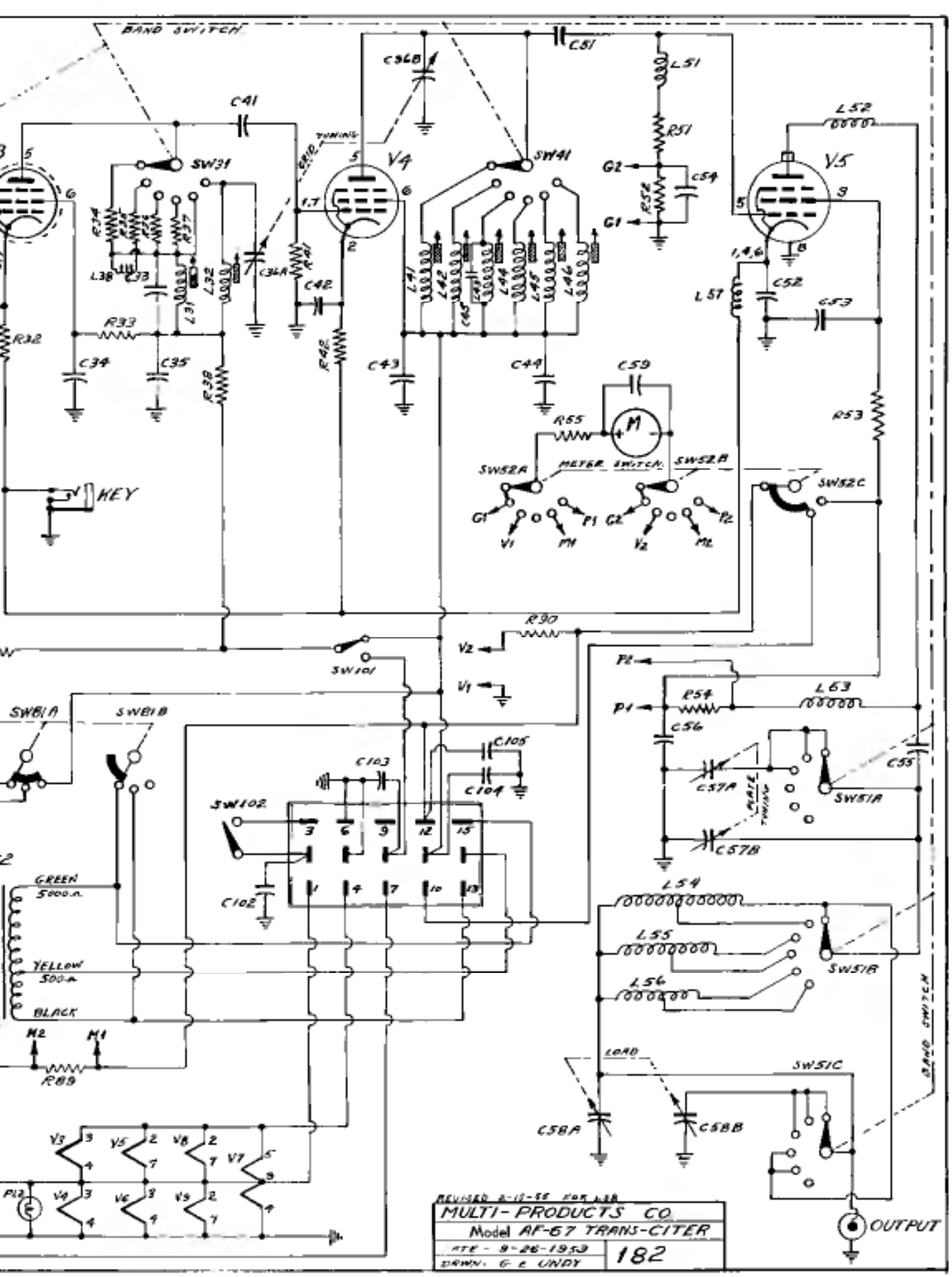
FIG. 6

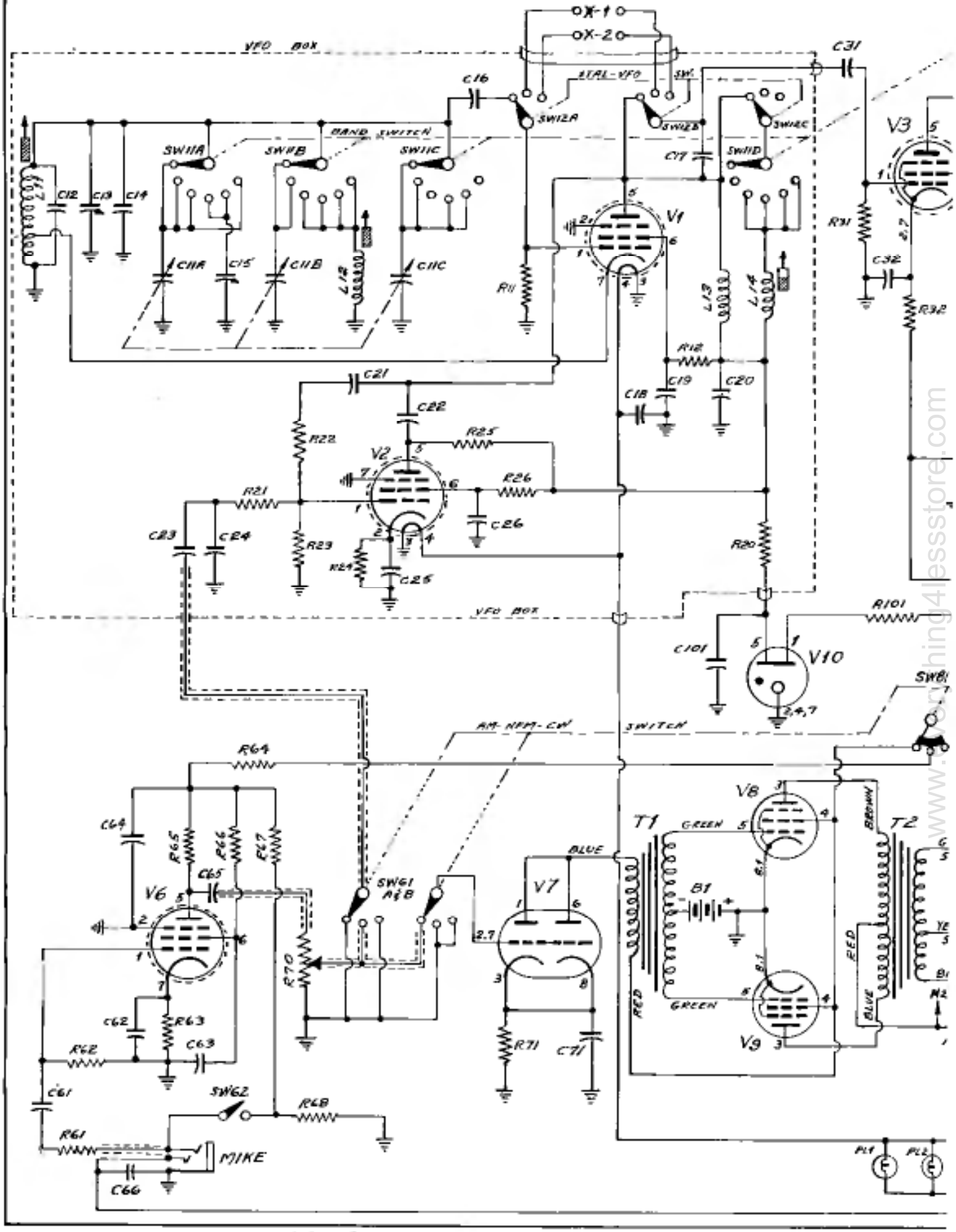


AC OPERATED EXCITER DRIVING CLASS "C" AMPLIFIER - NFM OR CW ONLY

FIG 7

RECOMMENED AF-67 POWER CONNECTIONS 219





MULTI - ELMAC

M-1051 POWER SUPPLY KIT

ASSEMBLY INSTRUCTIONS

1. Check all material shipped against parts list.

2. Assemble mechanical parts in the following order:

   Primary-Secondary terminal strips (12 Terminal)

   Transformers

   Fuse holders

   Vibrator sockets and Vibrator grounding clips

   Octal socket

   Selenium Rectifiers

   Relay

   Primary Input screw terminals

   Filter Choke

   Insert Vibrators and Fuses

   (DO NOT INSTALL MAIN FILTER CONDENSERS 70/125 Mfd UNTIL WIRING IS COMPLETED.)

3. Wire as per attached pictorial assembly drawing the following order.

   A. Solder back of primary ground terminal screw.

   B. Wire in primary buss bar from "HOT" terminal screw to fuse holders.

   C. Wire transformer primaries for input voltage desired. Pictorial diagram shows 12 volt primary connections. Refer to drawing 462 for necessary changes for 6 volt operation.

   D. Wire secondary transformer connections to terminal strip, control sockets, relays, seleniums, etc.

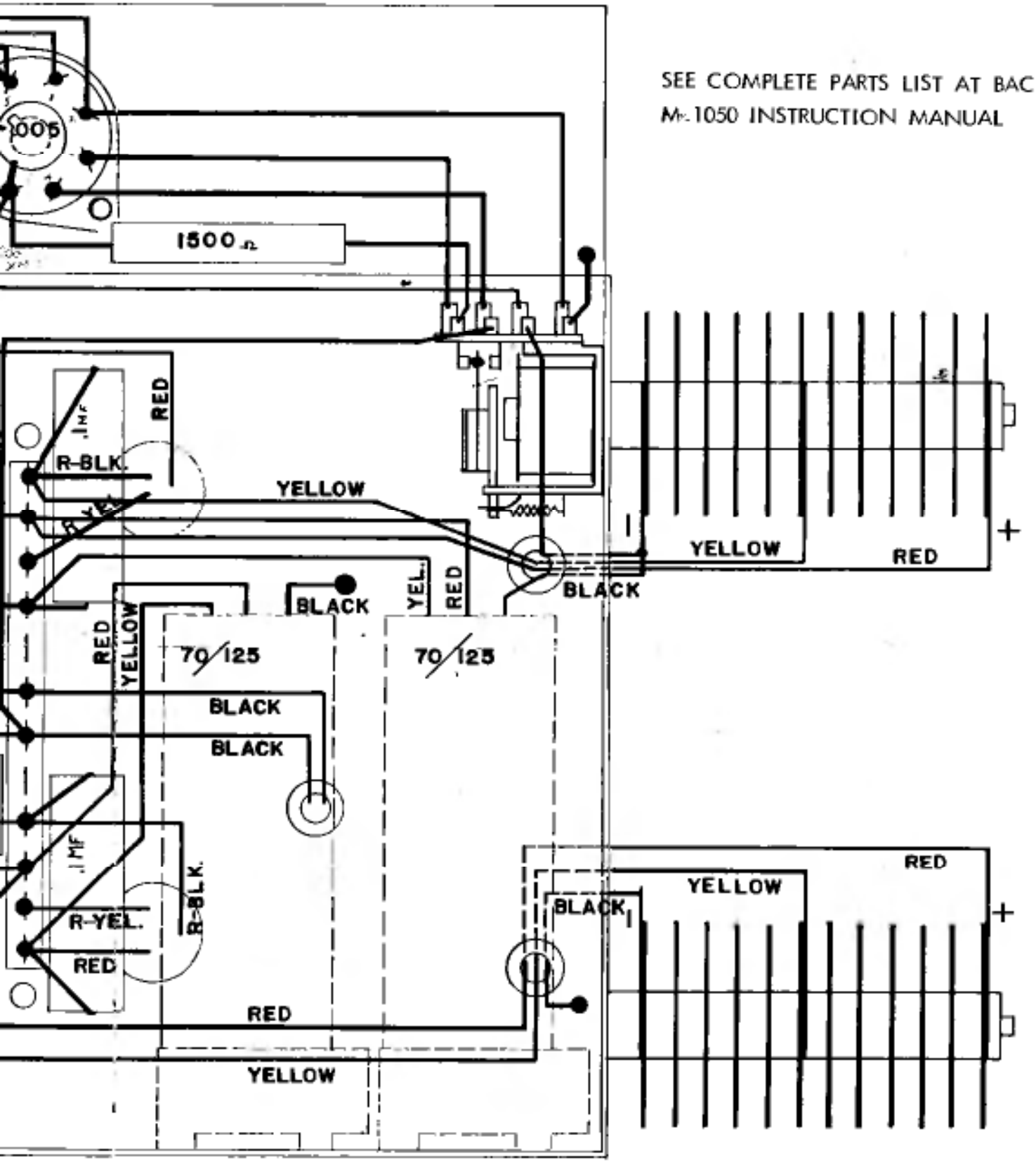
   E. Install main filter condensers and complete wiring as per drawing.

4. Test

   A. Connect wires from Selenium Rectifiers to desired Secondary Taps.

   B. Install cover plate over selenium section and bottom plate to protect operator from high voltage.

   C. Install with equipment as shown in instruction manual.



WIRED FOR 12 VOLT PRIMARY.

ANUAL FOR 6 VOLT PRIMARY WIRING.

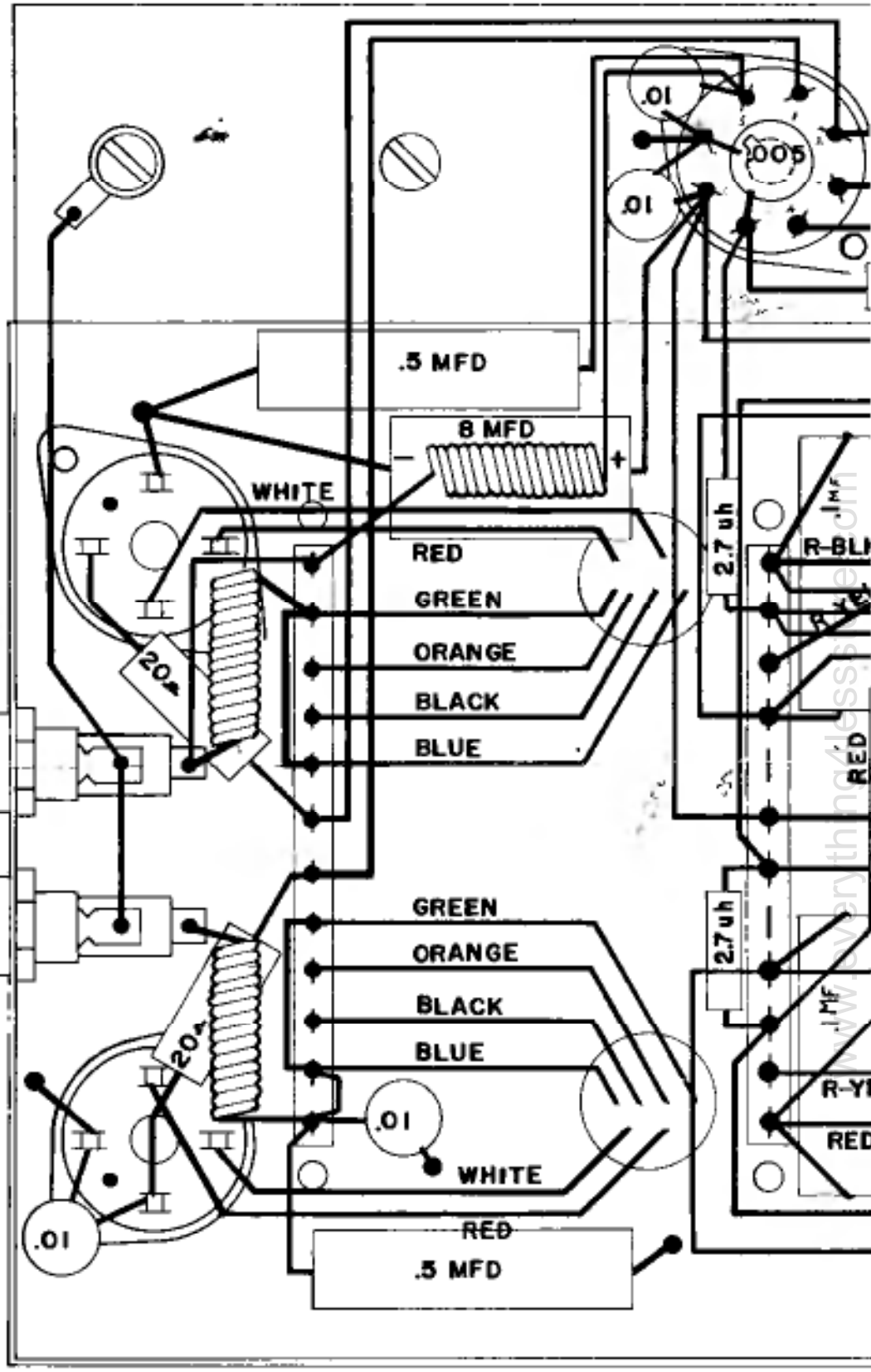


DIAGRAM OF SUPPLY WIRED

SEE INSTRUCTION MANUAL

MULTI-ELMAC MODEL M1050/M1051(KIT)

6/12 VOLT MOBILE POWER SUPPLY